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Acquisition Data Practice in the Era of Interconnected Digital Transformation

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Abstract

Acquisition business processes and strategies are fundamentally interconnected in nature. In an era of digital transformation, conventional data practice does not sufficiently meet the challenges of contemporary acquisition processes, policy, and implementation. In this paper, we describe a novel data practice approach for acquisition based on three fundamental concepts: practice, problem identification and solving, and organizational strategy. This approach expands on conventional practice to embrace the interconnected nature of acquisition, while adapting to and leveraging the dynamics of the big data landscape. It provides direction toward comprehensive data practice for acquisition and allows an organization to (1) comprehensively address issues across the entire supply-and-demand value chain, (2) identify localized acquisition action items and processes toward global intra- and interorganizational strategies, and (3) engage and communicate broadly on how acquisition impacts both upstream and downstream activities, resources, and personnel. The work described here also paves the way for future studies examining best practices in acquisition processes, policy, and implementation.

Introduction

Acquisition is a critical process with significant impacts on entire supply chain systems and enterprise strategy. In order to understand and more effectively implement acquisition processes, it is important to appreciate the *interconnected nature of acquisition.* Acquisition calls upon the entire supply-and-demand value chain and crosses intra- and interorganizational boundaries; local actions have global implications, and they can influence the entire organizational strategy.

In an era of ever-increasing digital transformation, conventional data practice does not sufficiently meet the challenges of contemporary acquisition processes, policy, and implementation. In fact, although supply chain may be at the heart of a company's operations, limitations of legacy data practices can be the death of supply chain management (Lyall, Mercier, & Gstettner, 2018). Some advocate for various data management solutions to start with a bottom-up approach to tackle challenges faced in the acquisition, while others propose adopting disruptive IT infrastructure and applications such as embedding AI and IoT technologies.

In this paper, we describe a novel data practice approach that embraces the interconnected nature of acquisition while adapting to and leveraging the dynamics of the world of big data. We formulated this approach based on data from an ongoing longitudinal study on data practice by the MIT CDOIQ program in collaboration with other universities and organizations, including Northeastern University and RAND. This study includes data from interviews and surveys of data practitioners in over 100 organizations across academia, industry, and government. Our proposed data practice applies fundamental perspectives from the following three areas

1) Practice (Bourdieu, 1990; Schon, 1983) and the practice of data work (Kwon, Lee, & Shin, 2014; Lee et al., 2014, 2006)
2) Problem identification and problem solving (Lee, 2004; Schon, 1983; Von Hippel & Von Krogh, 2016)
3) Organizational strategy (Mentzer et al., 2001; Tanriverdi & Du, 2020)

to contemporary data issues toward improved critical understanding and performance in acquisition practices and policy.

Data Practice for Acquisition in the Landscape of Big Data

In our ongoing research on data practice, we found that there are three common and critical questions that CDOs raise:

1) How do we know what data to collect?
2) What gaps exist in the data to answer questions?
3) How should the data be organized to support different kinds of analytics?

These are examples of important considerations that can lead to fruitful discussions and action items for improving data capabilities and leveraging data for organizational strategy, particularly at smaller scales within an organization or division. However, in the context of acquisition processes, policy, and implementation, these questions on their own are not sufficient to address the *interconnected* nature of acquisition and its impact on the entire supply-and-demand chain, nor do they address the ever-changing landscape of big data. Here, we demonstrate how these questions—or questions of a similar nature—can be adapted using a new data practice approach to comprehensively address interconnected acquisition processes, policy, and implementation.

Practice

Past literature posits that there is a critical relationship between knowing and doing, interpreting and using, symbolic mastery and practical mastery, and that it is important to acknowledge and communicate what is known and what is implemented (Bourdieu, 1990). In the field of data practice, studies have shown that data quality management is a critical component of big data analytics (Kwon et al., 2014). **Based on these studies, we highlight two fundamental concepts underlying *practice* that are crucial for data practice in acquisition:**

a) Understand and explicitly communicate the practitioner's logic, constraints, and opportunities. Often, these ideas are not explicitly expressed, even if they are known in some capacity. When they are explicitly expressed, it better informs the potential solutions.
b) Consider the established data practices (e.g., data quality products, data quality practice/governance, data quality management, etc.).

In the context of acquisition, addressing these two concepts helps us to understand the **interconnected data and interconnected data context**.

Example question 1: "How do we know what data to collect?"

a) Practitioner's logic: *The goal is to build IT infrastructure for analytics* (example). By communicating the goal explicitly, the answer to this question can be directed explicitly toward this goal. Additionally, communicating explicitly allows the organization to consider whether this is an appropriate goal for the organization, or at this time.

b) Without considering established data practices, one might answer this question with data items, such as customer data, product data, sales data, vendor data, etc.

However, from a data quality perspective, for example, this question can be more comprehensively answered by further asking:
Is the data **relevant**?
For example, *Did internal and external stakeholders participate in what data should be collected?*
Is the data **complete**?
For example, *What is the scope of the data beyond short-term needs (time horizon)?*
Does the data **add value**?
For example, *Future organizational goals and strategies, for example for future data consumers?*

These are some of the fundamental data quality dimensions of organizational data sets that can be considered, in addition to timeliness, accessibility, confidentiality, security, privacy, ease of manipulation, consistency, conciseness, amount of data, and so on (Lee, Pepino, Wang, & Funk, 2006). Additionally, from a data quality practice perspective, one might ask: Do we have a data governance mechanism to solicit data needs from diverse stakeholders?

Example question 2: "What gaps exist in the data to answer these questions?"

a) Practitioner's logic: More explicit communication of scope and boundary—are these business questions for the organization as a whole, or for the department? Analytic questions? Short-term questions or long-term questions?

b) From a data quality perspective, is the data **complete**?
For example, *Are the data complete to answer explicitly communicated questions*?

From a data quality practice perspective, who will address the gaps that exist, and is there a process and mechanism to report these gaps?

Example question 3: "How should the data be organized to support different kinds of analytics?"

a) Practitioner's logic: This type of question typically arises when data collected with originally different purposes are to be used for new purposes, typically for enhanced analysis and analytical purposes. It is a common issue among contemporary uses of the data collected for different purposes from different sources, at different times, from different companies, and different platforms. The various forms of heterogeneity play a large role in this issue. Once the company is detached from the original sources, the solution lies often at the core of more technical solutions and resolutions on integration methods and technologies.

Thus, it is critical for the context of the data and analytics—the logic, constraints, and opportunities—to be explicitly communicated as data gets used and reused.

b) This question inherently focuses on data storage alone, but from a data quality perspective, the organization could also consider data consumers' retrieval and use of the data—in other words, *ease of manipulation* and *consistency*. Additionally, from a data quality practice perspective, for example, the organization could also consider whether there is a process or mechanism to report on data analytics needs and competency.

Problem Identification and Problem Solving

Previous work describes the importance of formulating and identifying a problem in order to solve a problem, while also efficiently engaging various stakeholders (Schon, 1983; Von Hippel & Von Krogh, 2016). **In the context of acquisition, we argue that it is critical to understand the interconnected nature of the problem, which naturally allows us to find the appropriate solution to that problem.** Doing so may also trigger engagement from more diverse resources and divisions, such as business experts, subject experts beyond the IT and data experts, rank-and-file members, and even external stakeholders.

Example question 1: "How do we know what data to collect?"

This question would be better served if we first identify a problem that the data collected can address.

For example, what collective inquiry does the organization have?
Furthermore, what mechanism is in place to report and summarize that inquiry?

Example question 2: "What gaps exist in the data to answer these questions?"

This question would be better served by identifying a specific problem and solution, for example,

Problem identified: Which questions are we asking? Questions about vendors, customers, products, future market, etc.

Solution identified: What kind of gaps exist? Not enough data? Difficulty in use of data?

Example question 3: "How should the data be organized to support different kinds of analytics?"

This question is inherently bounded to a technical problem (supporting different kinds of analytics) for a technical solution (finding ways to organize the data). As such, it naturally recruits IT/analytics (problem) and data (solution) experts.

Such an approach focuses on stored data in a database, but particularly in the context of acquisition, data does not exist in a vacuum, and it is influenced by the underlying business process and organizational strategy. If we were to consider the interconnectivity of the data while identifying the problem and solution, we would also consult business experts (who oversee the underlying business process and organizational strategy) and data consumers (who use the results from analytics and organized data) *in addition to* data, IT, and analytics experts.

Organizational Strategy

Previous studies find that impediments such as bureaucratic control, internal political or cultural constraints, and external restrictions lead many organizations to have difficulty changing at the same rate as their environments (Zhang, Lee, Wang, & Huang, 2017). These internal and external restrictions are the byproducts of organizational inertia and are common phenomena (Hannan & Freeman, 1977). Other considerations include trust in industry relationships, supply-chain integration issues, and IT use in supply-chain relationships (Gunasekaran & Ngai, 2004; Kumar, 1996; Masli et al., 2016; McAfee & Brynjolfsson, 2008; Porter, 2008; Subramani, 2004; Tanriverdi & Du, 2020).

In the context of acquisition, we argue that considering the organizational strategy—as well as the interorganizational boundaries, relationships, trust, integration, politics, and constraints—from an interconnected, strategic perspective encourages the organization to assess the alignment between its strategic goals and business processes with its data needs.

Example question 1: "How do we know what data to collect?"

This question would be better served by also asking, for example,

Toward what organizational goal, and by what strategy?
Are stakeholders invested in this goal?

What are the interorganizational boundaries that may limit this?
How will this data be shared across these boundaries?
Who controls the data? Who controls the data collection process?

Example question 2: "What gaps exist in the data to answer these questions?"

This question would be better served by also asking, for example,

Are these questions addressing the organizational goals or operations for specific departments?

Are there known and unknown gaps hidden due to interorganizational boundaries?

Example question 3: "How should the data be organized to support different kinds of analytics?"

This question would be better served by also asking, for example,

How do different analytic solutions address organizational strategies and goals?

How will different analytic solutions be aligned across interorganizational boundaries?

How will data organization influence how data consumers interact with that data?

Conclusion and Future Implications

Understanding acquisition in the context of these three data practice concepts (i.e., practice, problem identification and solving, and organizational strategy) embraces the ***interconnected*** quality of data, which is at the heart of acquisition business processes and strategies. It expands on conventional practice to address the unique and complex nature of acquisition, and it provides direction toward comprehensive data practice for acquisition. In particular, it allows an organization to

1) Comprehensively address issues across the entire supply-and-demand value chain.
2) Identify localized acquisition action items and processes toward global intra- and interorganizational strategies.
3) Engage and communicate broadly on how acquisition impacts both upstream and downstream activities, resources, and personnel.

The work described here demonstrates a powerful new approach to data practice for acquisition and paves the way for future studies examining best practices in acquisition processes, policy, and implementation.

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